PATENT
ATTORNEY DOCKET NO. 041514-5143

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	
Masakazu OGASAWARA, et al.	)	
	)	
Application No.: 09/944,098	)	Group Art Unit: 2651
	)	
Filed: September 4, 2001	)	Examiner: Unassigned

OIPE JC177 DEC 04 2001 PATENT & TRADEMARK OFFICE

For: OPTICAL PICKUP DEVICE AND FOCUS ERROR DETECTING METHOD THEREFOR

Commissioner for Patents
Washington, D.C. 20231

SUBMISSION OF FORMAL DRAWINGS

Filed herewith are twenty-six (26) sheets of formal patent drawings containing fifty (50) figures. It is requested that these drawings be approved and made part of the official record in the above-identified patent application.

If there are any fees due in connection with the filing of these drawings, please charge the fees to our Deposit Account No. 50-0310. If a fee is required for an extension of time under 37 C.F.R. 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP

John G. Smith
Reg. No. 33,818

Dated: December 4, 2001

Customer No. 009629
MORGAN, LEWIS AND BOCKIUS LLP
1800 M STREET, N.W.
WASHINGTON, D.C. 22036-5869
(202)467-7000

FIG. 1

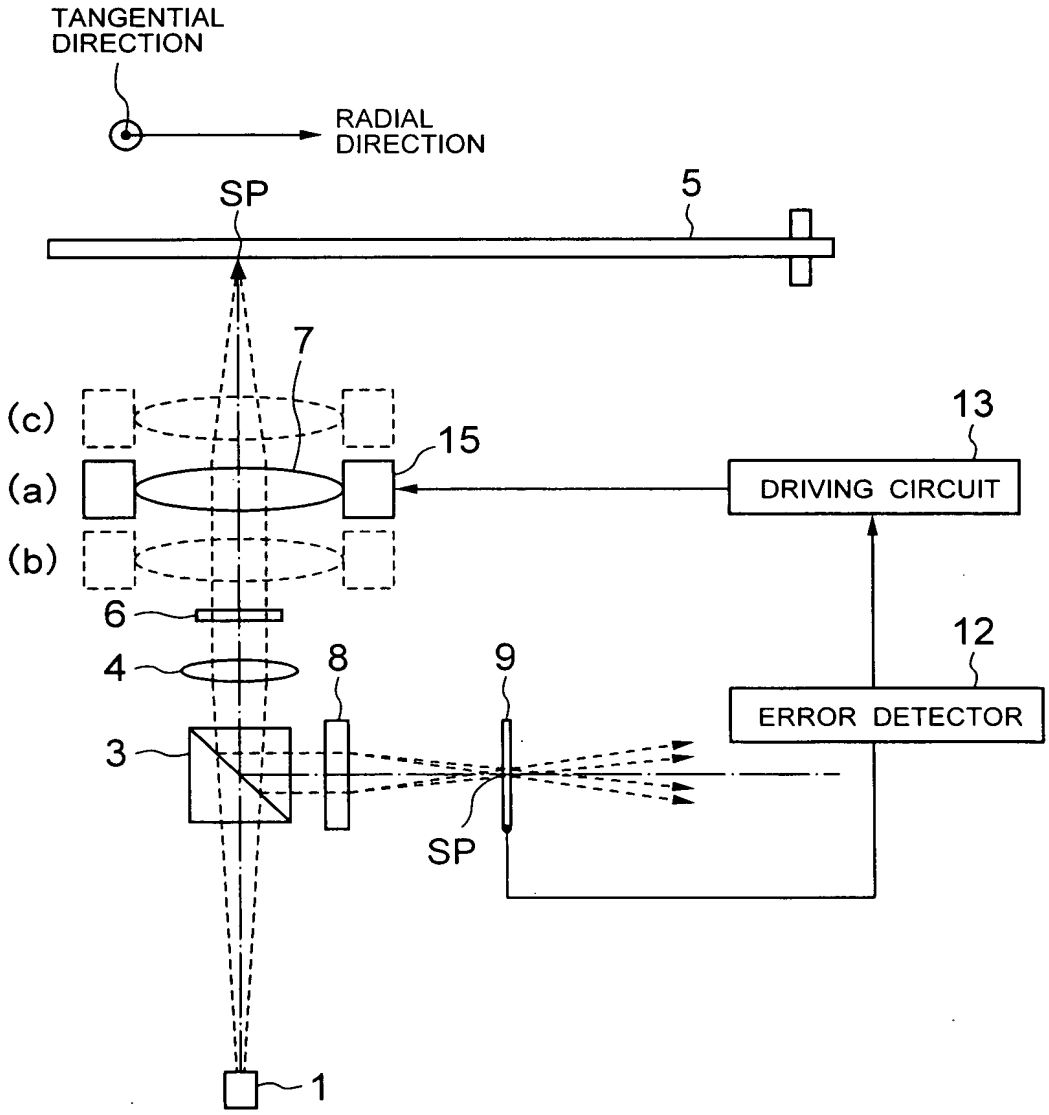
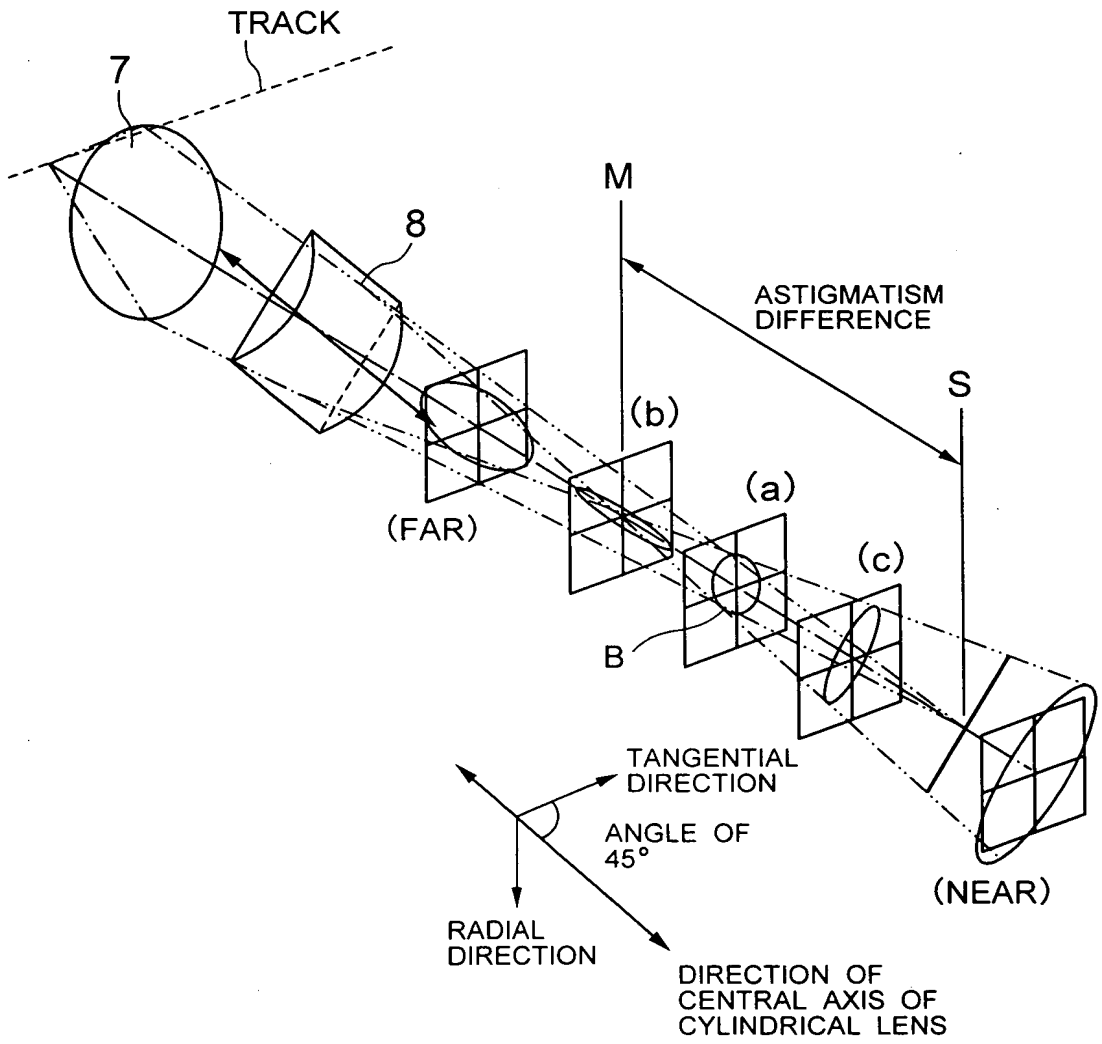

TANGENTIAL DIRECTION
RADIAL DIRECTION
SP
5
7
(c)
(a)
(b)
15
13
DRIVING CIRCUIT
6
4
8
9
12
ERROR DETECTOR
3
SP
1

FIG. 2


TRACK
7
8
M
ASTIGMATISM
DIFFERENCE
S
(b)
(a)
(c)
(FAR)
B
TANGENTIAL
DIRECTION
ANGLE OF
45°
(NEAR)
RADIAL
DIRECTION
DIRECTION OF
CENTRAL AXIS OF
CYLINDRICAL LENS

Patent Scanned

FIG. 3B
(FAR)

FIG. 3A
(FOCUSED)

FIG. 3C
(NEAR)

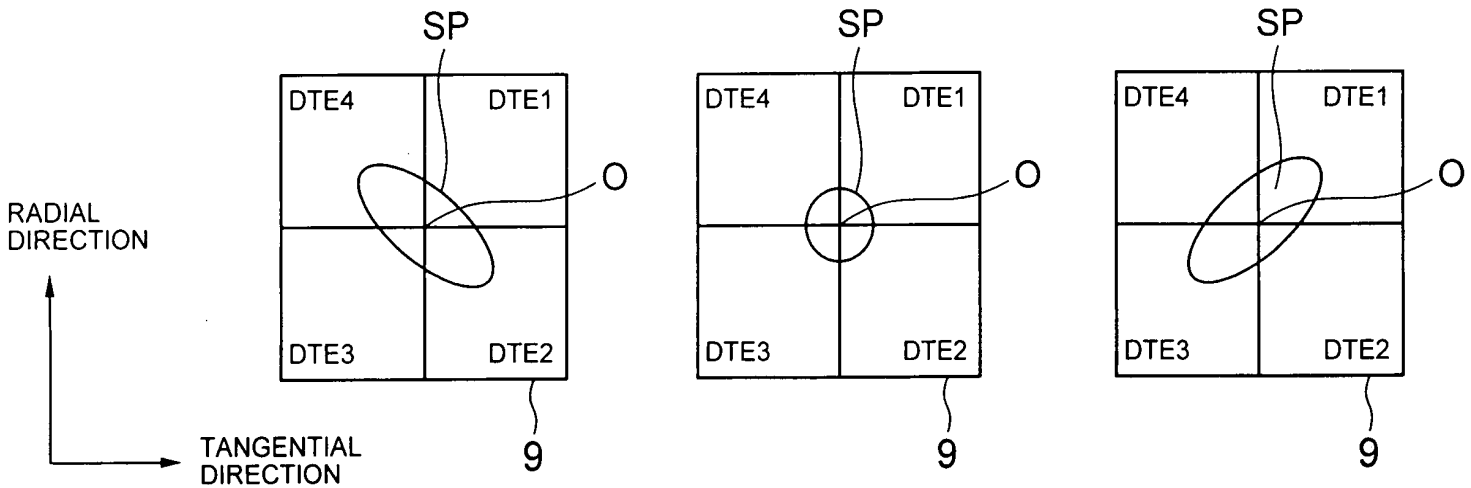


FIG. 4

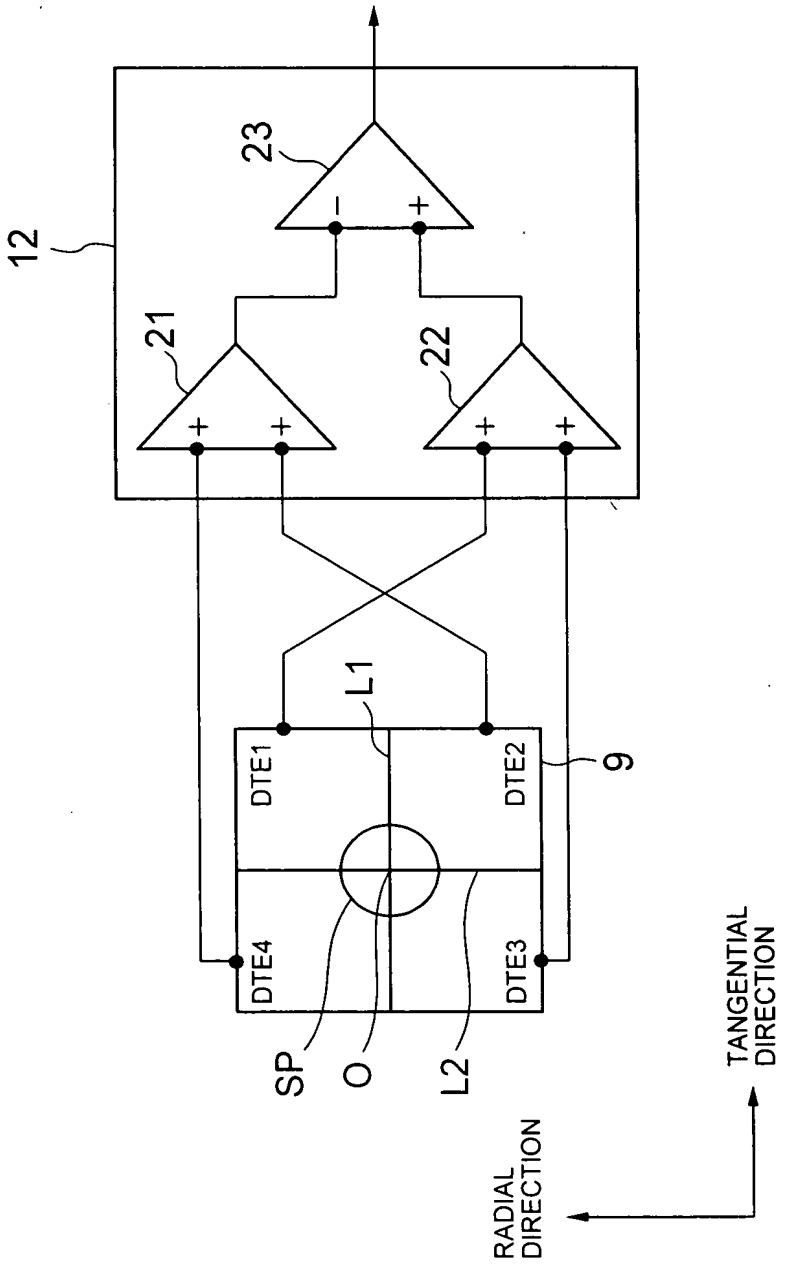

12
23
21
22
L1
DTE1
DTE2
DTE4
DTE3
9
SP
O
L2
RADIAL DIRECTION
TANGENTIAL DIRECTION

FIG. 5

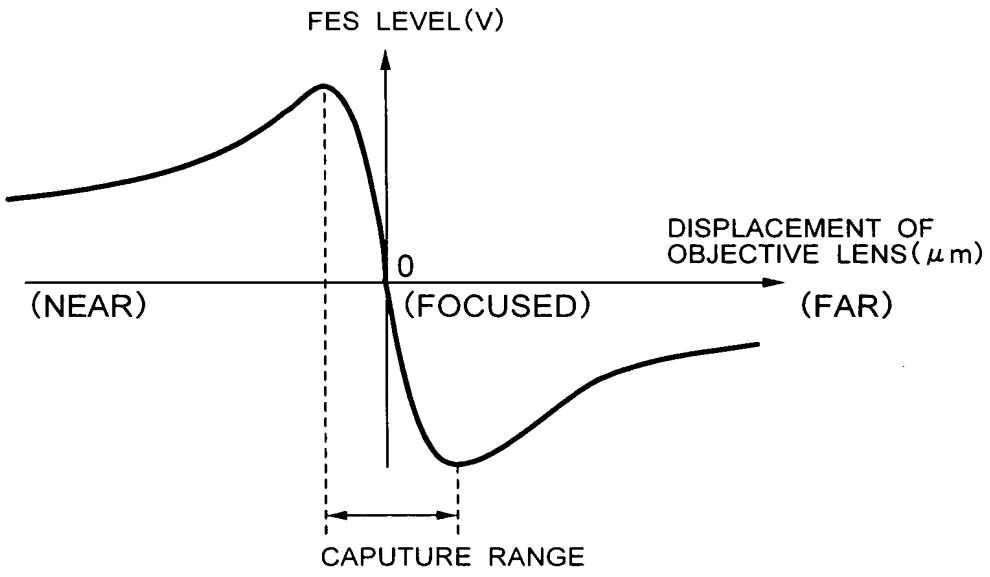

FES LEVEL(V)
DISPLACEMENT OF OBJECTIVE LENS(μm)
0
(NEAR)
(FOCUSED)
(FAR)
CAPUTURE RANGE

FIG. 6

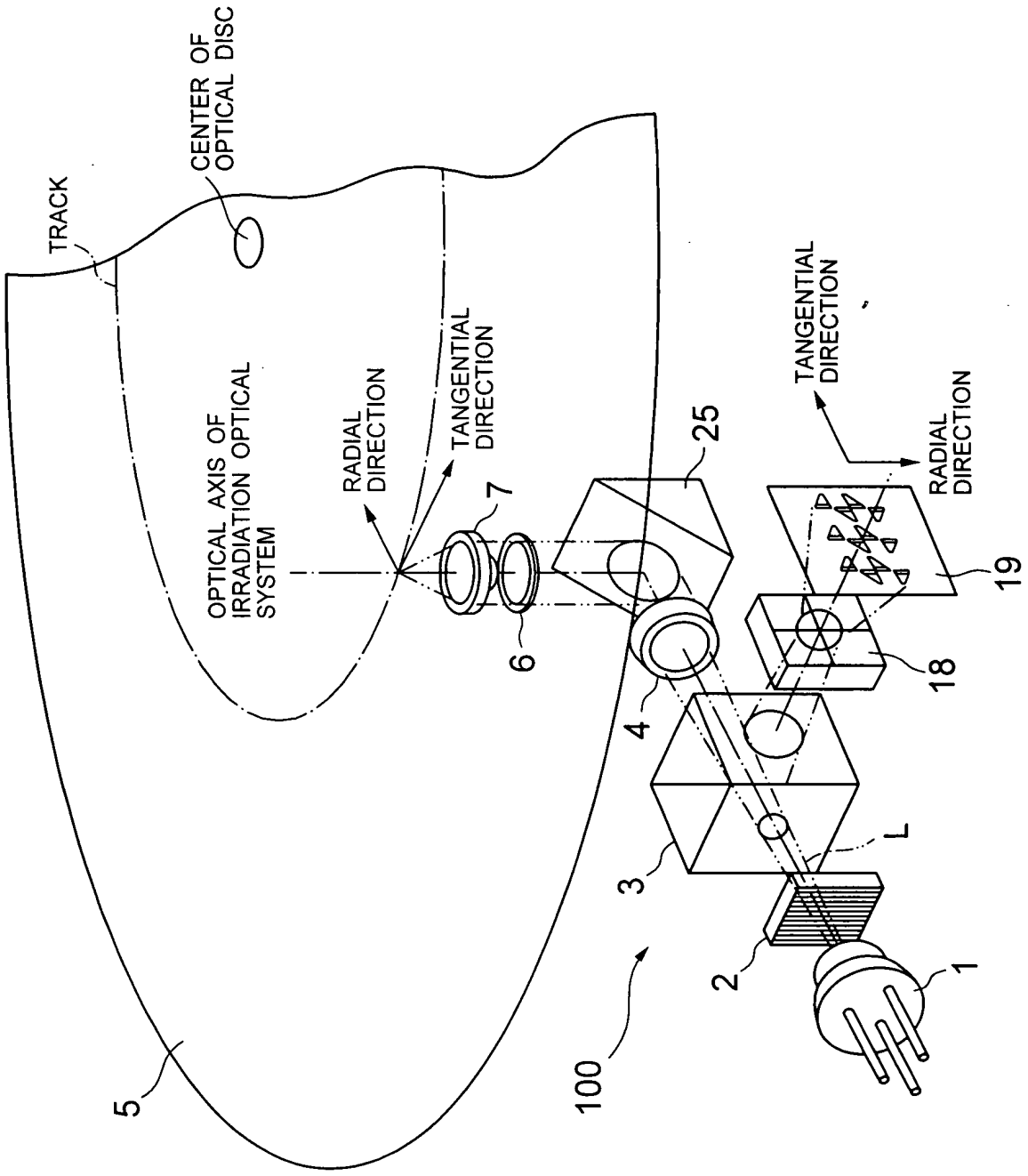

TRACK
CENTER OF OPTICAL DISC
OPTICAL AXIS OF IRRADIATION OPTICAL SYSTEM
RADIAL DIRECTION
TANGENTIAL DIRECTION
TANGENTIAL DIRECTION
RADIAL DIRECTION
5
100
1
2
3
4
6
7
18
19
25
L

FIG. 7

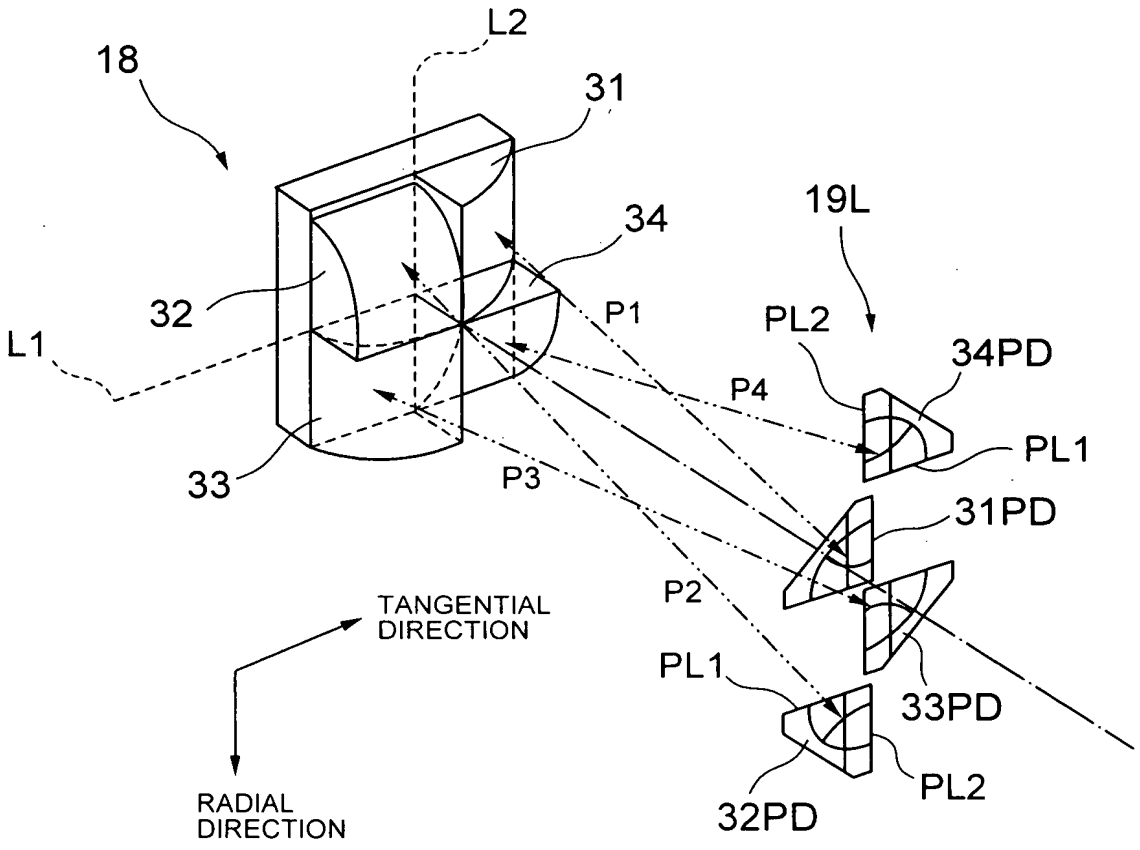

L2
18
31
34
19L
32
P1
PL2
34PD
L1
P4
PL1
33
P3
31PD
P2
TANGENTIAL DIRECTION
PL1
33PD
PL2
RADIAL DIRECTION
32PD

FIG. 8

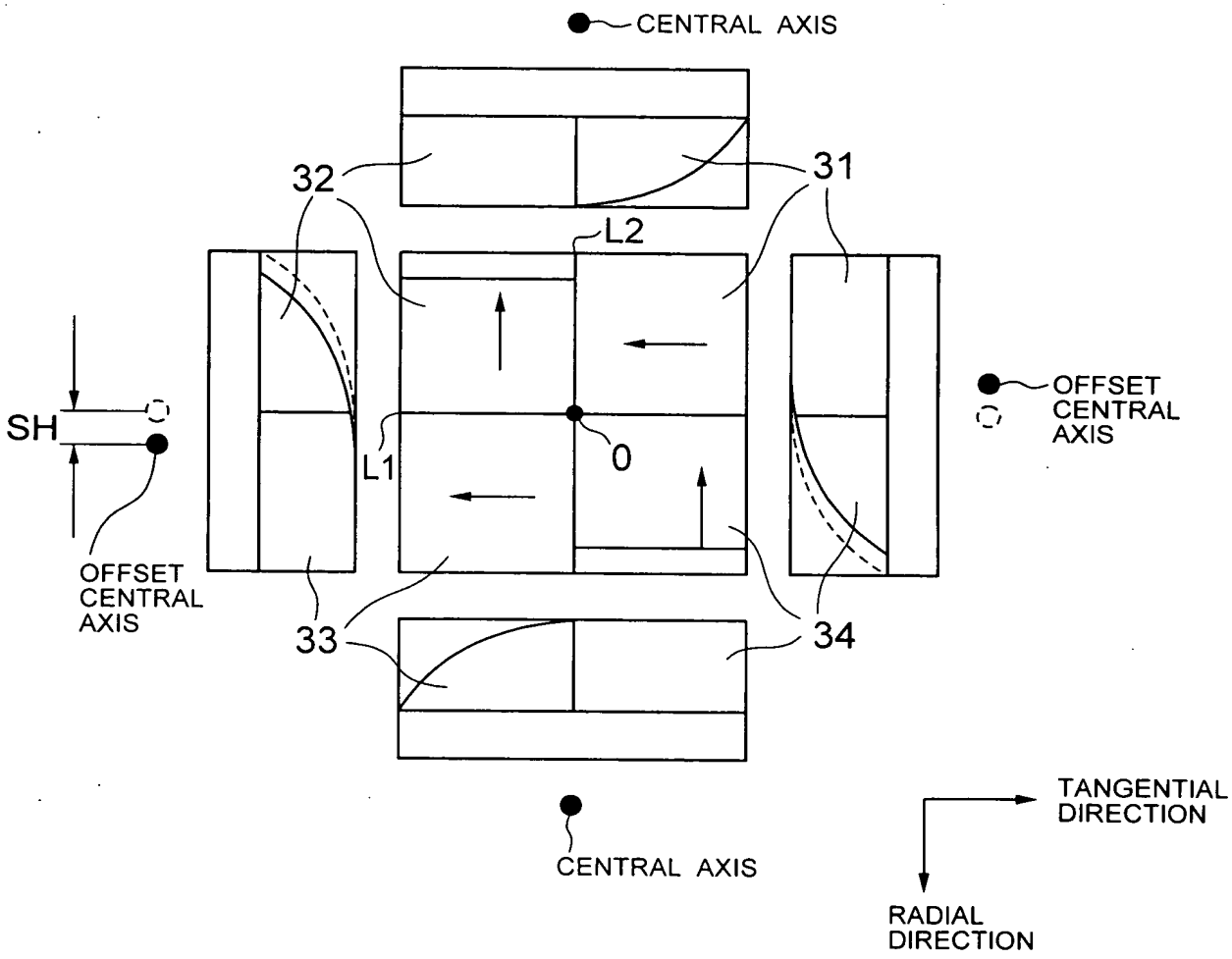

CENTRAL AXIS
32
31
L2
SH
L1
0
OFFSET
CENTRAL
AXIS
OFFSET
CENTRAL
AXIS
33
34
CENTRAL AXIS
TANGENTIAL
DIRECTION
RADIAL
DIRECTION

FIG. 9

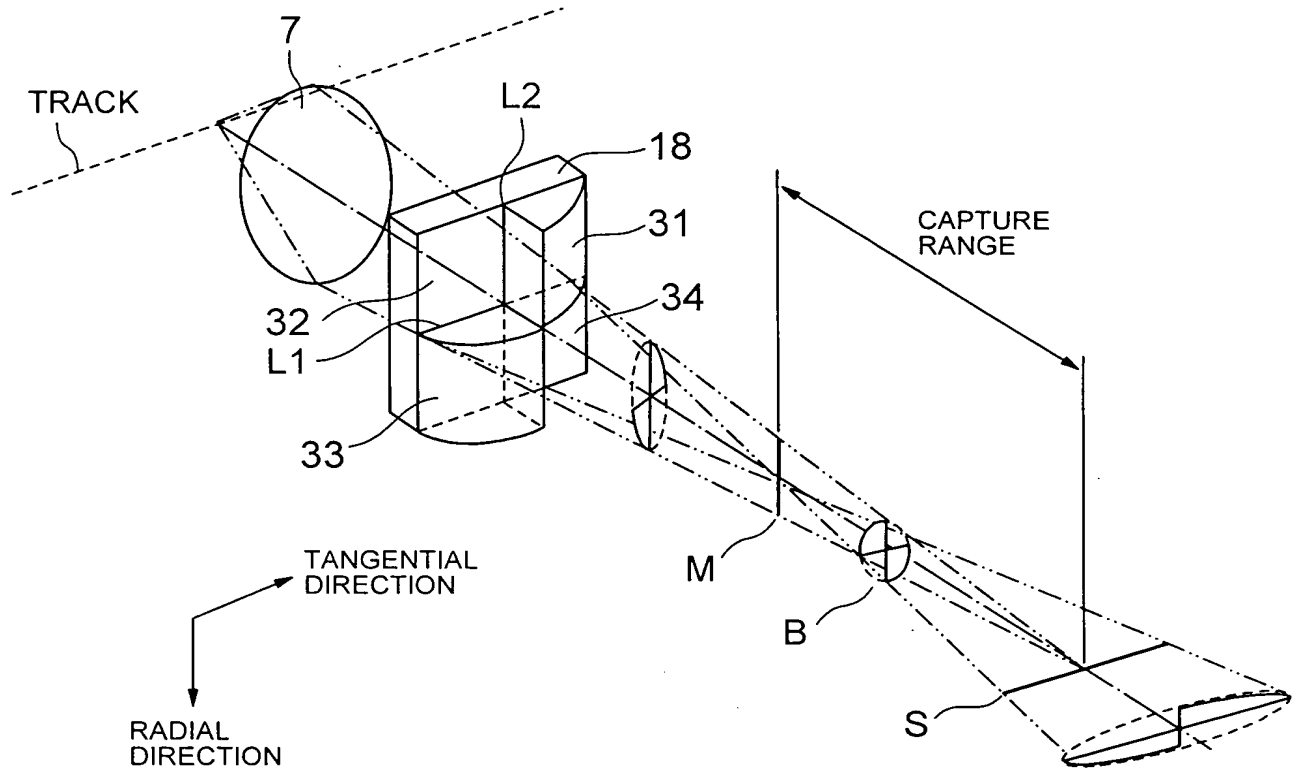

7
TRACK
L2
18
31
CAPTURE
RANGE
32
34
L1
33
TANGENTIAL
DIRECTION
M
B
S
RADIAL
DIRECTION

FIG. 10

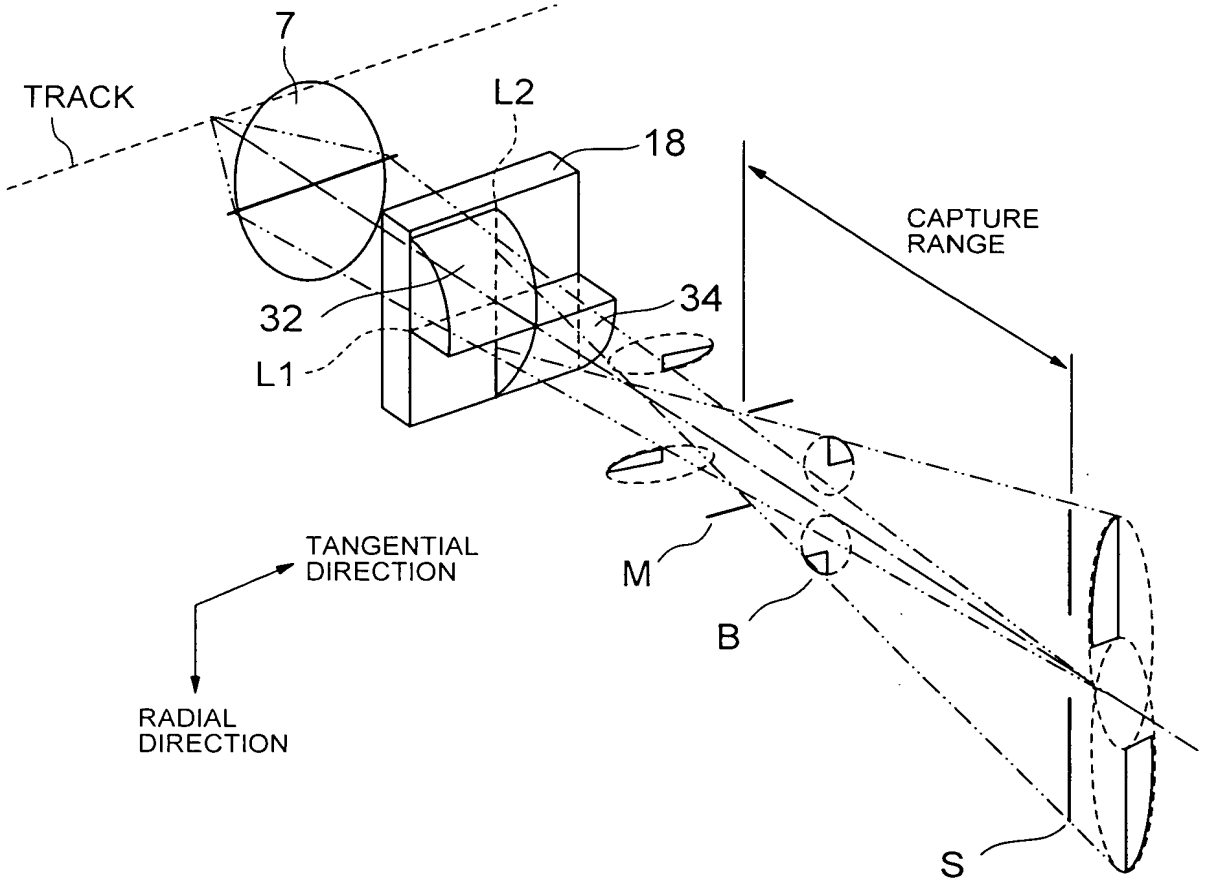

7
TRACK
L2
18
CAPTURE
RANGE
32
34
L1
TANGENTIAL
DIRECTION
M
B
RADIAL
DIRECTION
S

FIG. 11

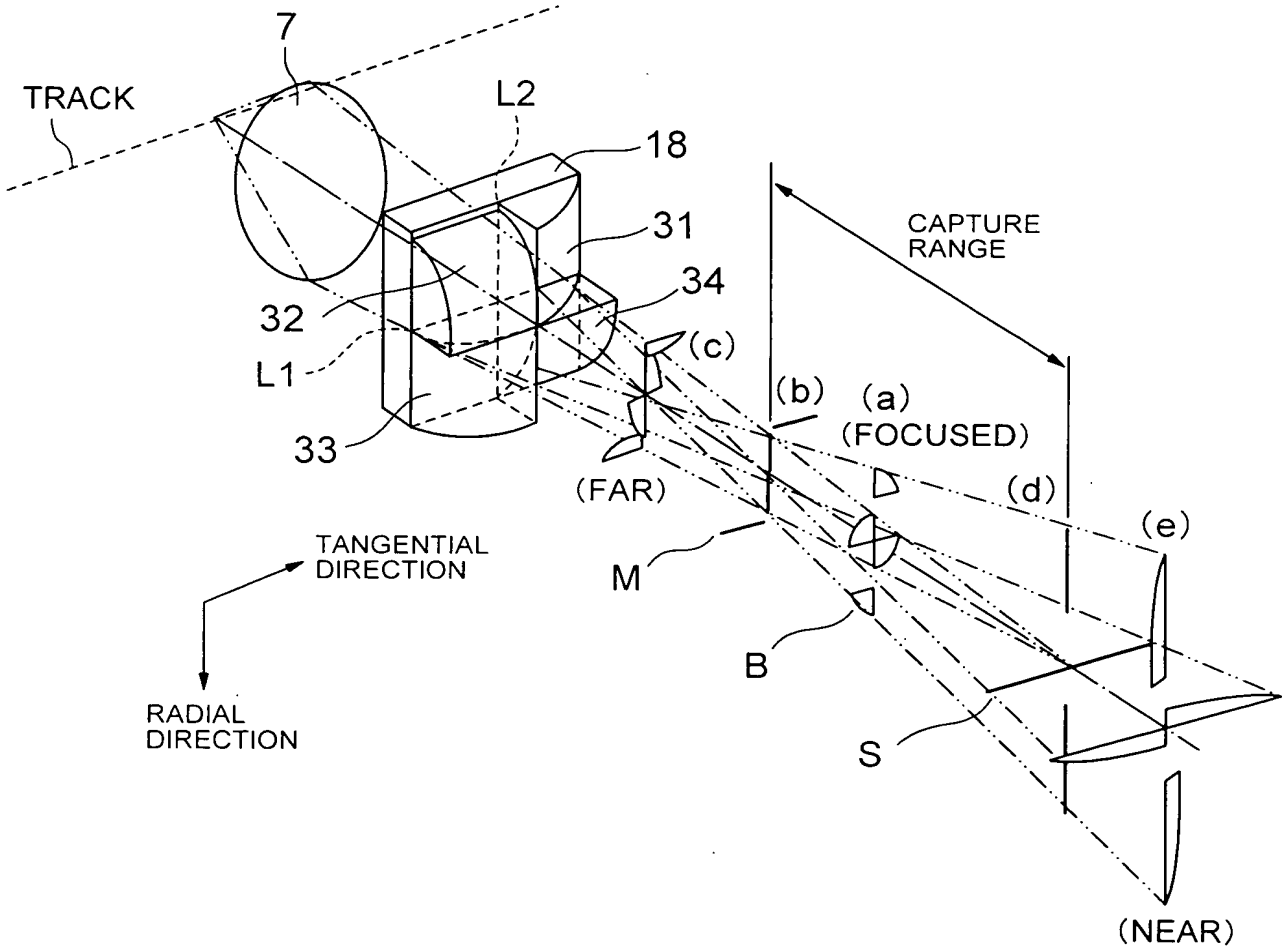

7
TRACK
L2
18
31
34
32
L1
33
(c)
(b)
(a)
(FOCUSED)
(d)
(e)
(FAR)
CAPTURE
RANGE
TANGENTIAL
DIRECTION
RADIAL
DIRECTION
M
B
S
(NEAR)

FIG. 12

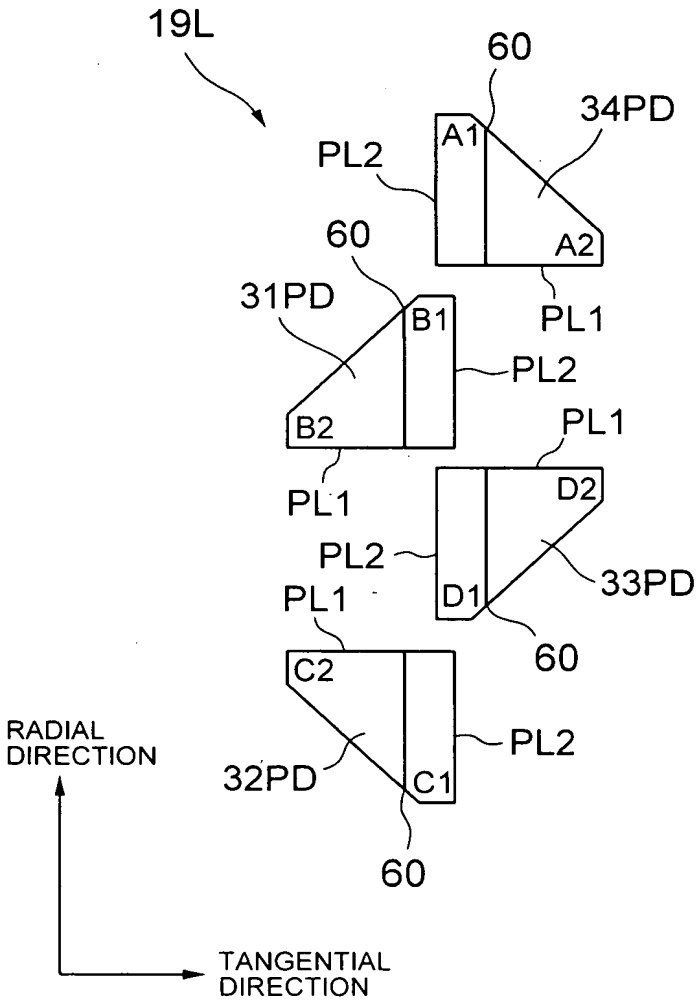

19L
60
34PD
A1
PL2
A2
PL1
60
31PD
B1
PL2
B2
PL1
PL1
D2
PL2
33PD
D1
PL1
60
C2
PL2
32PD
C1
60
RADIAL DIRECTION
TANGENTIAL DIRECTION

FIG. 13E
(NEAR)

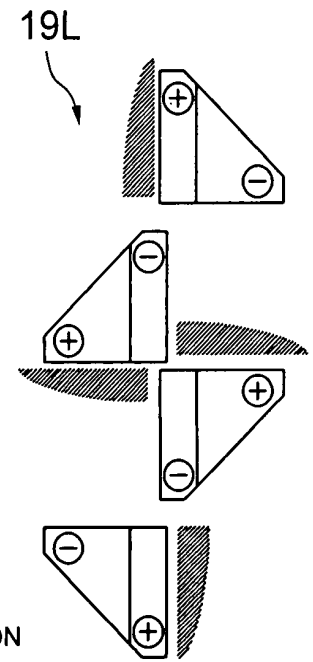


FIG. 13D

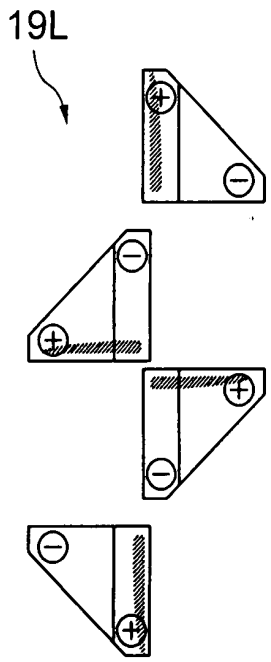


FIG. 13A
(FOCUSED)

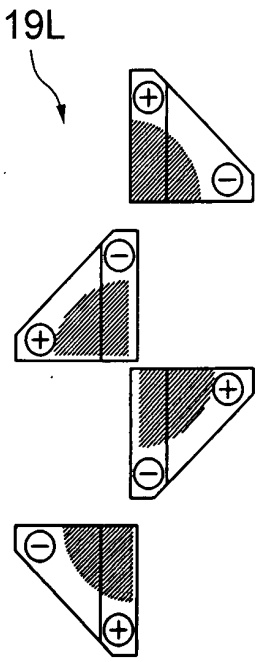


FIG. 13B

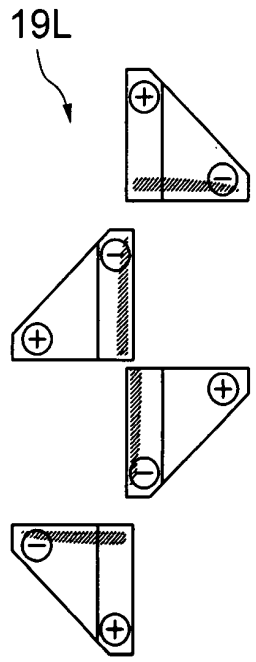
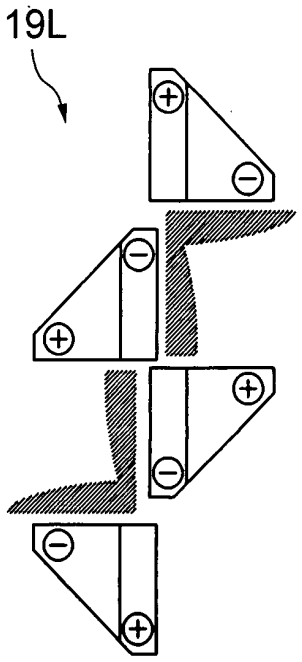


FIG. 13C
(FAR)



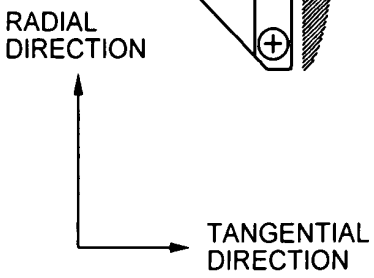


FIG. 14

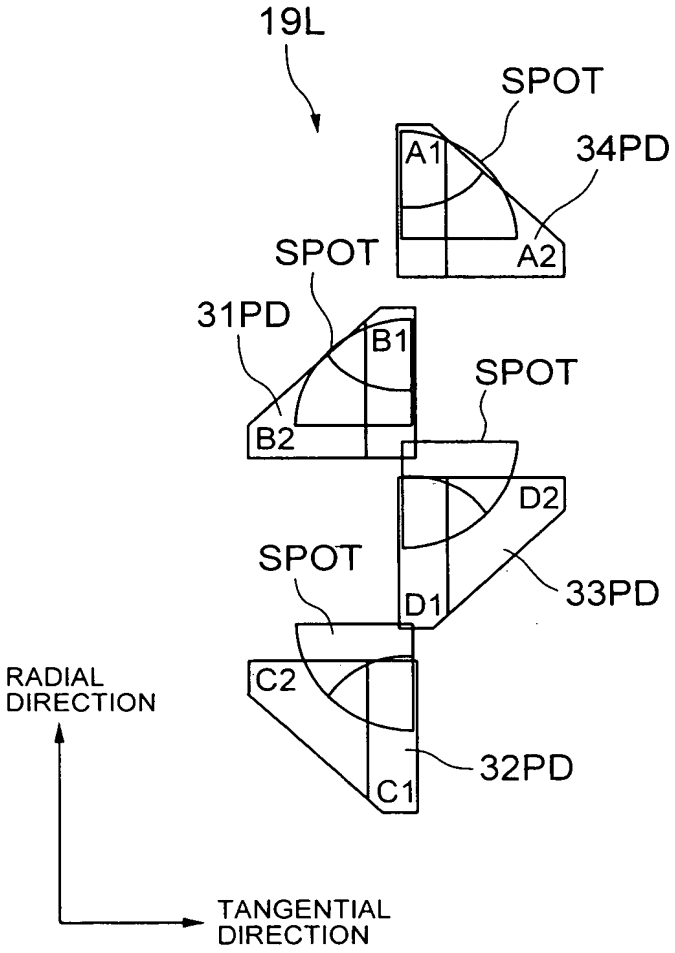

19L
SPOT
A1
34PD
A2
SPOT
31PD
B1
B2
SPOT
D2
SPOT
D1
33PD
C2
C1
32PD
RADIAL DIRECTION
TANGENTIAL DIRECTION

FIG. 15

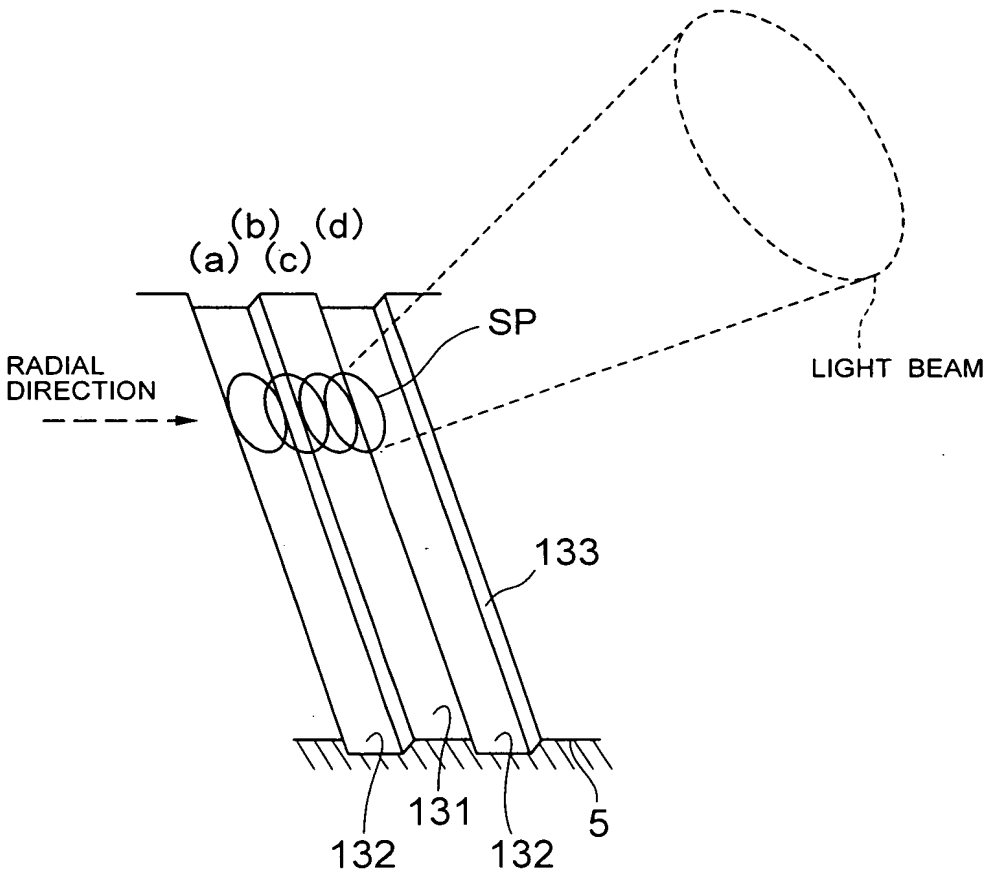


FIG. 16A FIG. 16B FIG. 16C FIG. 16D

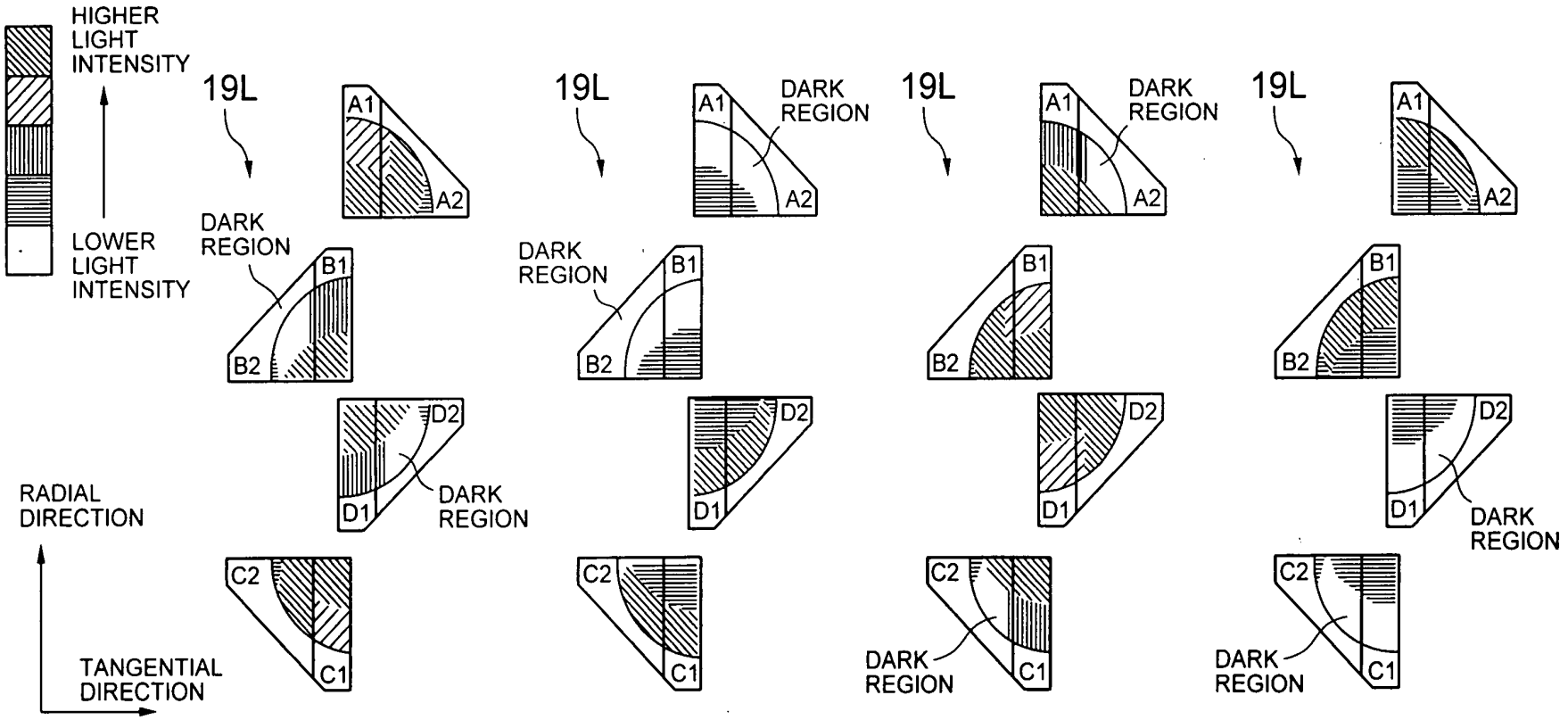


FIG. 17

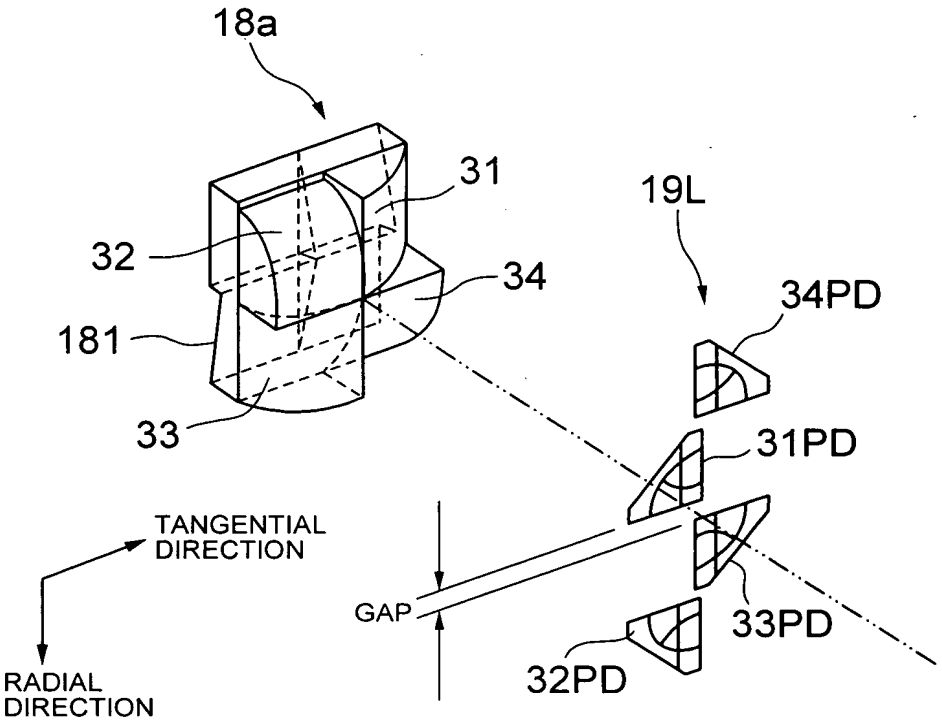

18a
31
32
34
181
33
19L
34PD
31PD
33PD
32PD
GAP
TANGENTIAL DIRECTION
RADIAL DIRECTION

FIG. 18

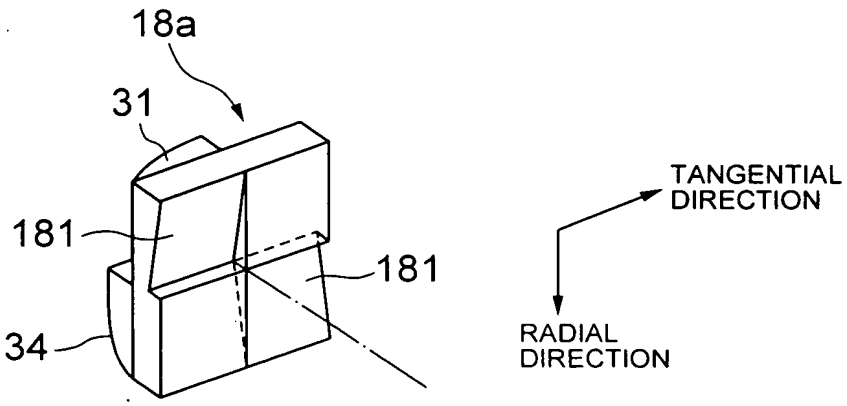

18a
31
181
181
34
TANGENTIAL DIRECTION
RADIAL DIRECTION

FIG. 19

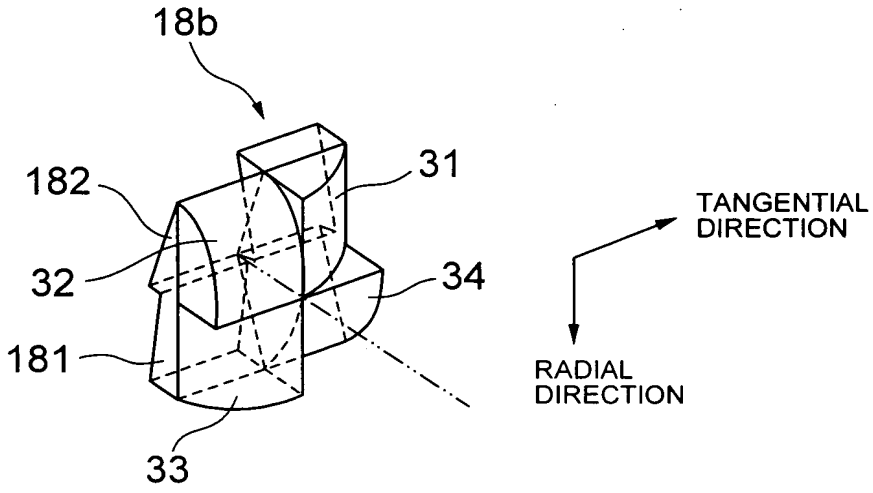

18b
182
31
32
34
181
33
TANGENTIAL DIRECTION
RADIAL DIRECTION

FIG. 20

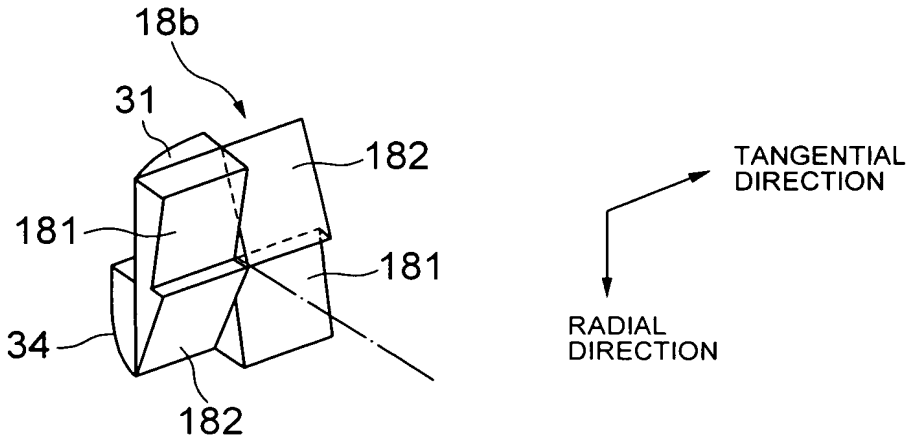

18b
31
182
181
181
34
182
TANGENTIAL DIRECTION
RADIAL DIRECTION

FIG. 21

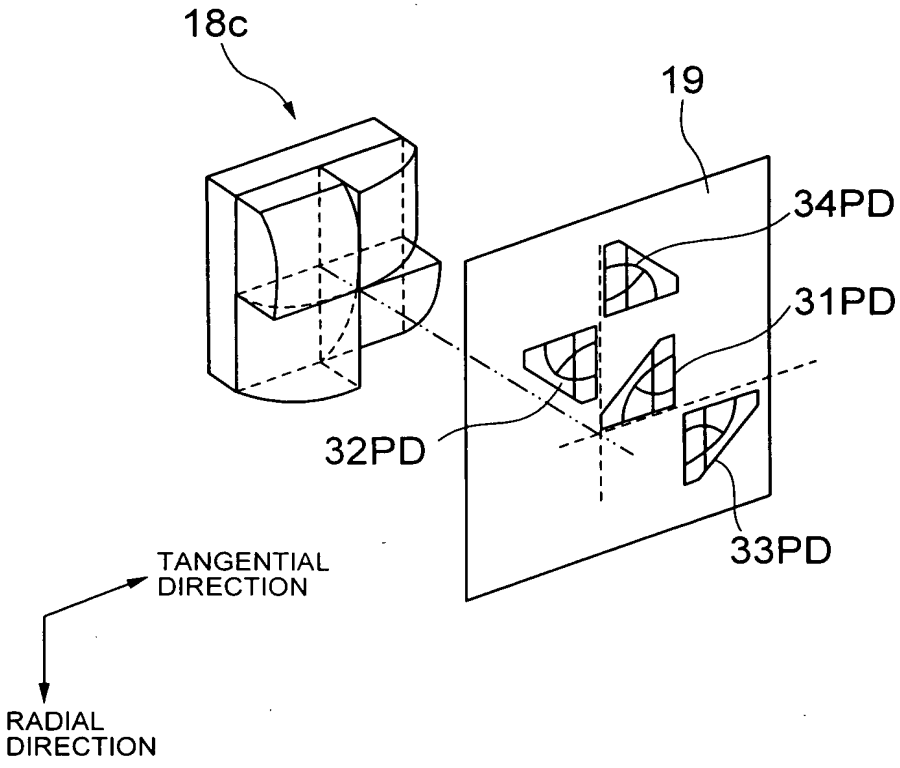

18c
19
34PD
31PD
32PD
33PD
TANGENTIAL DIRECTION
RADIAL DIRECTION

FIG. 22E

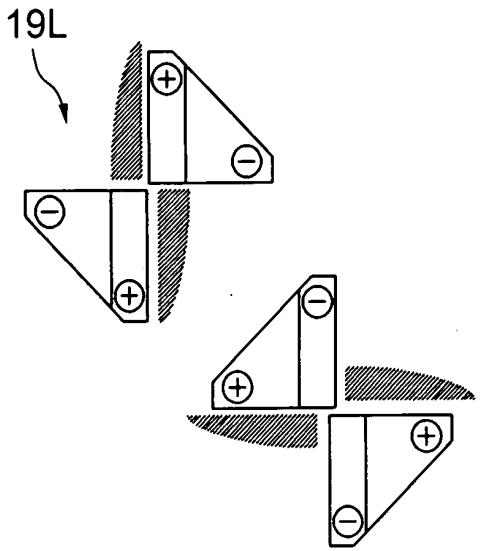


FIG. 22A

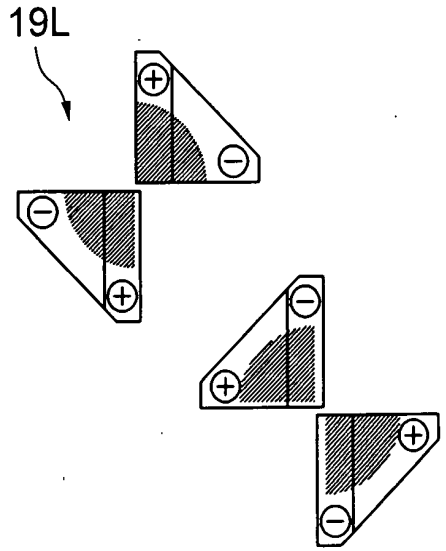


FIG. 22C

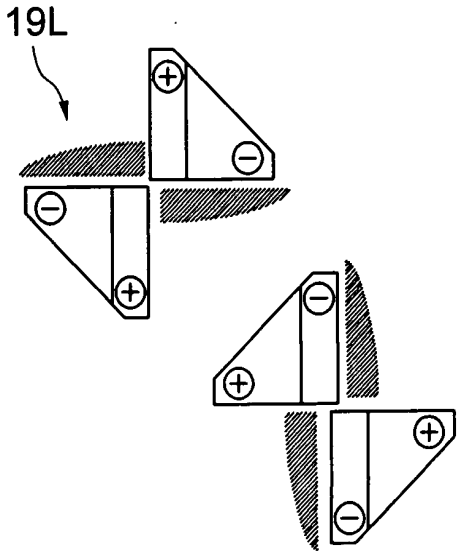


FIG. 22D

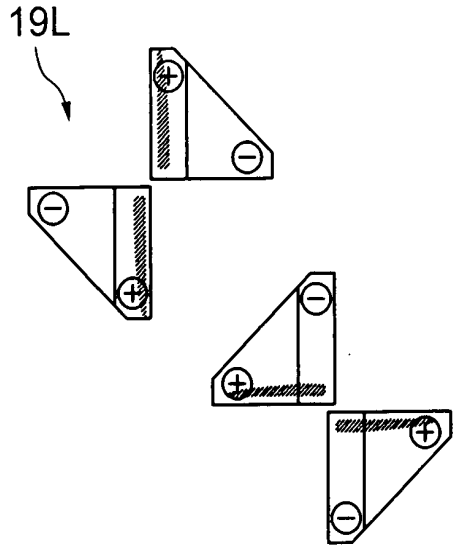
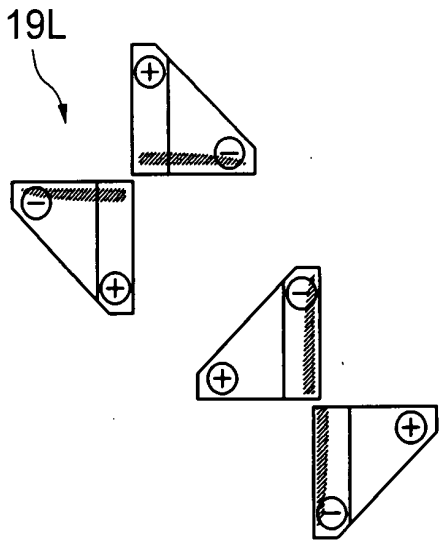


FIG. 22B



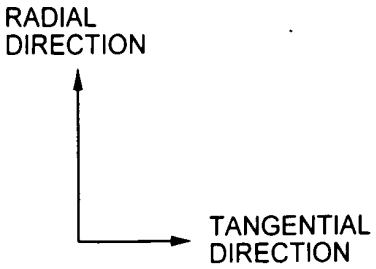


FIG. 23

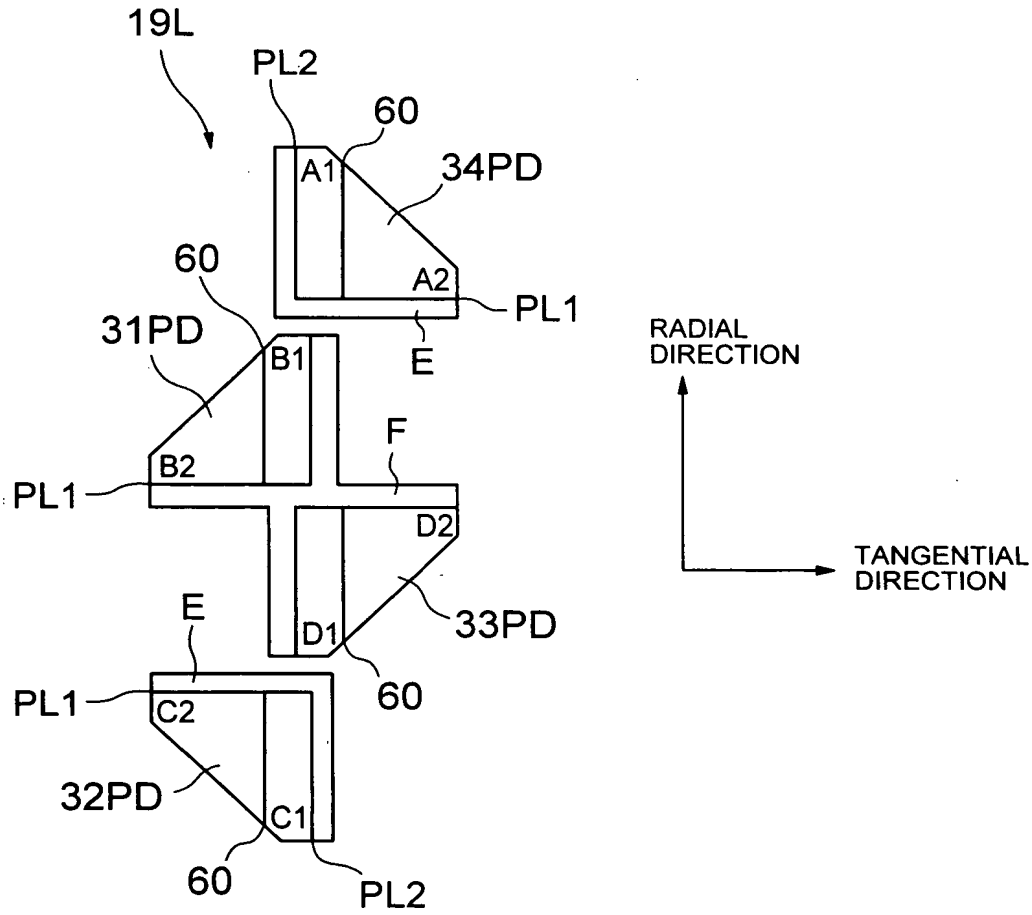

19L
PL2
60
A1
34PD
60
A2
PL1
31PD
B1
E
F
B2
PL1
D2
E
D1
33PD
PL1
C2
60
32PD
C1
60
PL2
RADIAL DIRECTION
TANGENTIAL DIRECTION

FIG. 24E

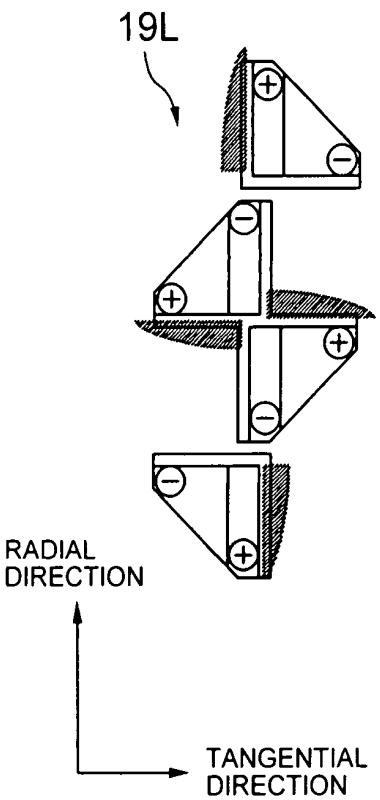


FIG. 24D

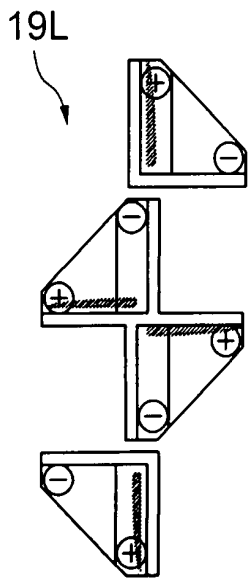


FIG. 24A

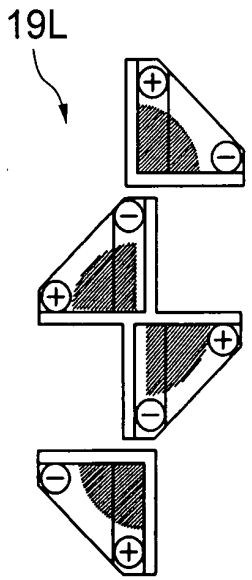


FIG. 24B

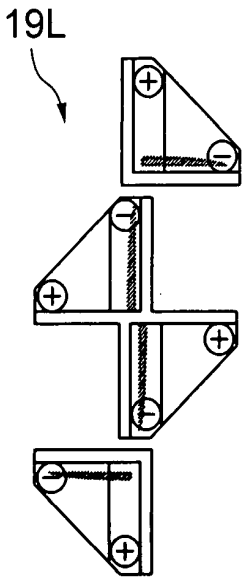


FIG. 24C

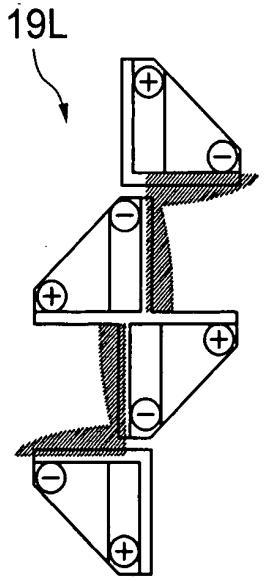


FIG. 25

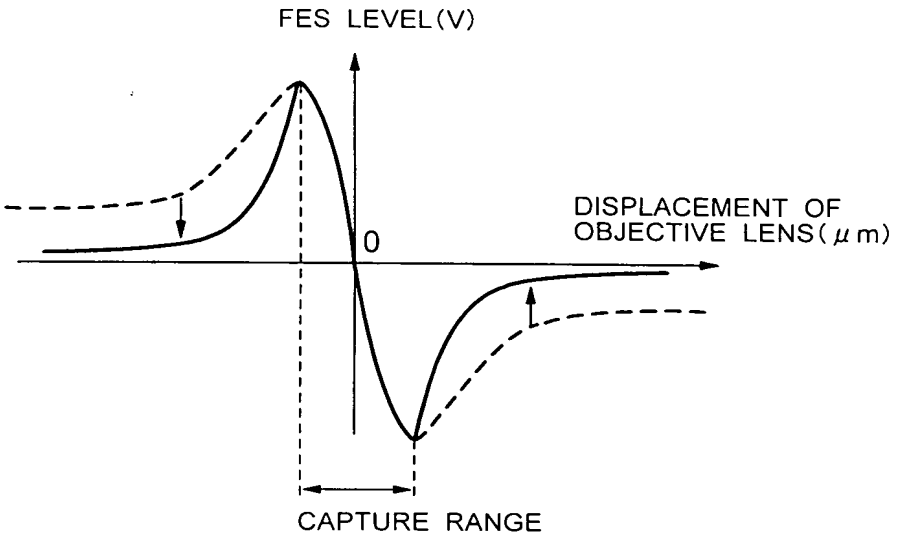

FES LEVEL(V)
DISPLACEMENT OF OBJECTIVE LENS(μm)
0
CAPTURE RANGE

FIG. 26

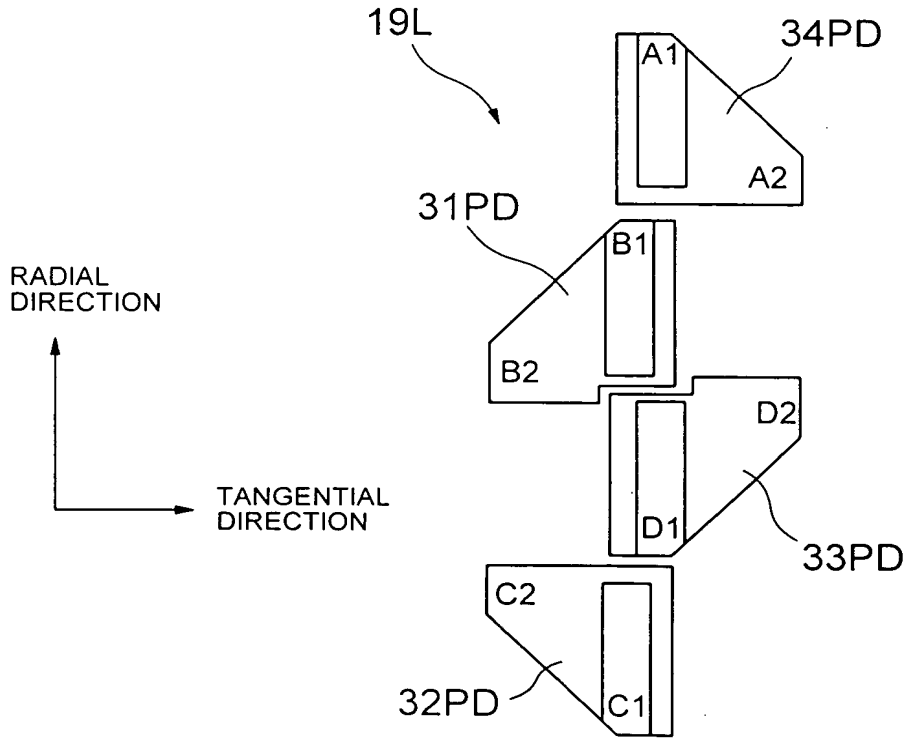

19L
34PD
A1
A2
31PD
B1
B2
D2
D1
33PD
C2
C1
32PD
RADIAL DIRECTION
TANGENTIAL DIRECTION

FIG. 27

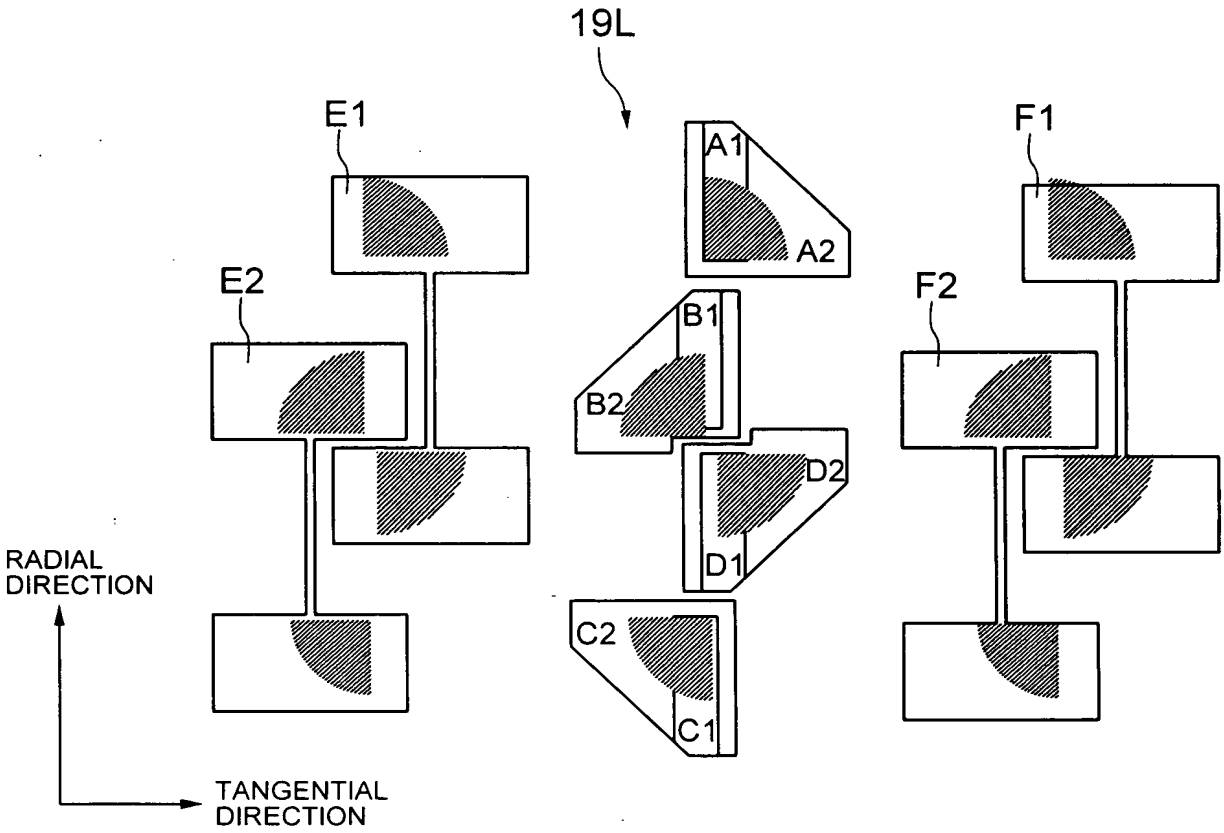

19L
E1
E2
A1
A2
B1
B2
D2
D1
C2
C1
F1
F2
RADIAL DIRECTION
TANGENTIAL DIRECTION

FIG. 28

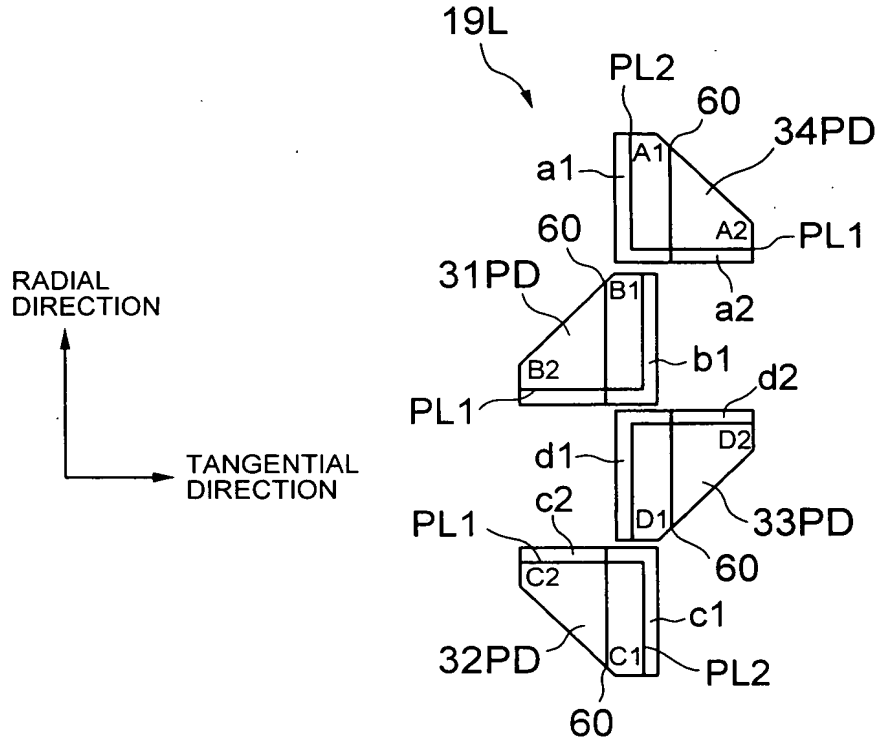

19L
PL2
60
34PD
a1
A1
A2
PL1
60
31PD
B1
a2
B2
b1
d2
PL1
D2
d1
D1
33PD
c2
PL1
60
C2
c1
32PD
C1
PL2
60
RADIAL DIRECTION
TANGENTIAL DIRECTION

FIG. 29

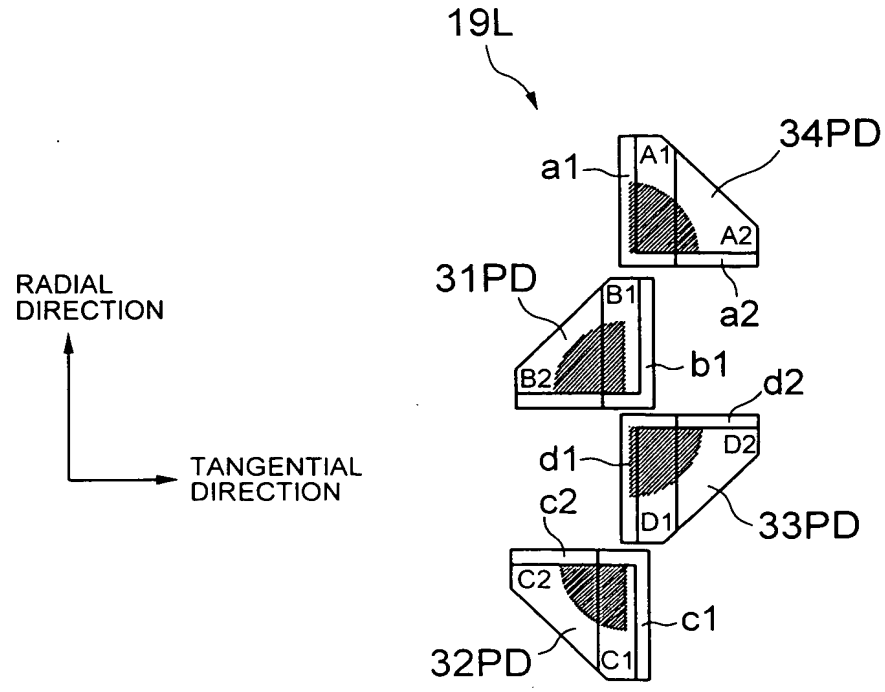

19L
34PD
a1
A1
A2
31PD
B1
a2
B2
b1
d2
D2
d1
D1
33PD
c2
C2
c1
32PD
C1
RADIAL DIRECTION
TANGENTIAL DIRECTION

FIG. 30A

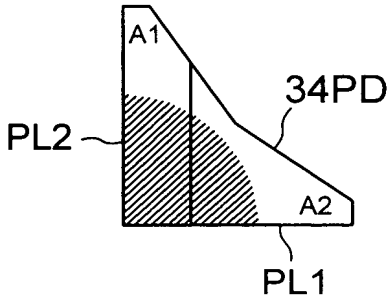


FIG. 30B

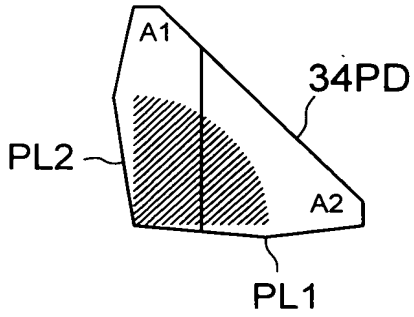


FIG. 30C

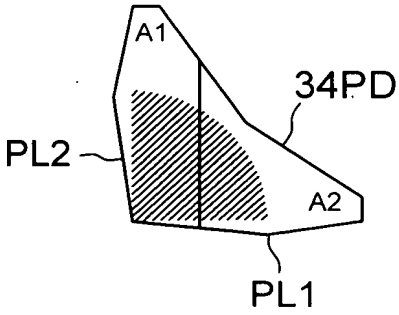
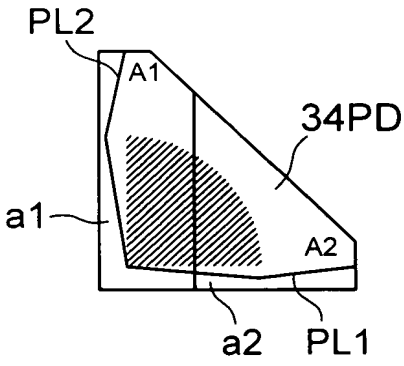



FIG. 30D